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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/639,163	08/16/2000	Kaori Tai	32011-165642	3981

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EXAMINER

COLEMAN, WILLIAM D

ART UNIT

PAPER NUMBER

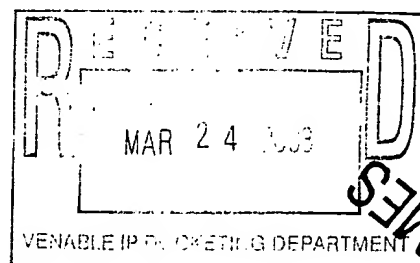
2823

DATE MAILED: 03/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Response Due
DOCKETED

CLIENT/MATTER # _____ ATTY JRB/RJF
DUE DATE 6-20-03
FINAL DEADLINE 9-20-03
DKTED BY KRD MF



Office Action Summary

Application No.

09/639,163

Applicant(s)

TAI, KAORI

Examiner

W. David Coleman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 January 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 17 and 18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 7, 2003 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 4, 5, 9, 12, 13 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants admitted prior art in view of Derderian et al., U.S. Patent 6,245,191.

4. Applicant's admitted prior art discloses a semiconductor method substantially as claimed.

Pertaining to claims 1 and 8, Applicant's admitted prior art teaches a method of producing semiconductor devices by cobalt silicide technology with titanium nitride film as the cap film, comprising:

removing titanium nitride film 112 which is arranged over underlying cobalt silicide film using a ammonium-hydrogen peroxide-water mixture (see disclosure page 3, lines 17-19).

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However, Applicants admitted prior art fails to omit the ammonium in the etching step.

Derderian teaches removing a titanium nitride film comprising a 30% hydrogen peroxide solution in water (column 4, lines 40-50). In view of Derderian, it would have been obvious to one of ordinary skill in the art to use only a hydrogen-peroxide and water mixture in Applicant's admitted prior art because characteristic parameters of the etching solution droplet include the chemical potential, such as surface tension, chemical reactant and reaction product boundary layers within the etching solution (column 4, lines 25-49).

5. Please note Omission of an Element and Its Function Is Obvious If the Function of the Element Is Not Desired. *Ex parte Wu*, 10 USPQ 2031 (Bd. Pat. App. & Inter. 1989) (Claims at issue were directed to a method for inhibiting corrosion on metal surfaces using a composition consisting of epoxy resin, petroleum sulfonate, and hydrocarbon diluent. The claims were rejected over a primary reference which disclosed an anticorrosion composition of epoxy resin, hydrocarbon diluent, and polybasic acid salts wherein said salts were taught to be beneficial when employed in a freshwater environment, in view of secondary references which clearly suggested the addition of petroleum sulfonate to corrosion inhibiting compositions. The Board affirmed the rejection, holding that it would have been obvious to omit the polybasic acid salts of the primary reference where the function attributed to such salt is not desired or required, such as in compositions for providing corrosion resistance in environments which do not encounter fresh water.). See also *In re Larson*, 340 F.2d 965, 144 USPQ 347 (CCPA 1965) (Omission of additional framework and axle which served to increase the cargo carrying capacity of prior art mobile fluid carrying unit would have been obvious if this feature was not desired.); and *In re Kuhle*, 526 F.2d

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553, 188 USPQ 7 (CCPA 1975) (deleting a prior art switch member and thereby eliminating its function was an obvious expedient).

6. Pertaining to claims 4 and 5, Applicant's admitted prior art teaches a method of producing semiconductor devices, comprising:

forming cobalt film **110** on the top surface of a silicon substrate **100**, which has a gate electrode **108** and a diffusion layer **102**;

forming titanium nitride **112** as the cap film on the top surface of cobalt film **110**;

selectively reacting the silicon of silicon substrate **100** and the cobalt film **110**; and

removing titanium nitride film **112** which is arranged over underlying cobalt silicide film using ammonium hydrogen peroxide-water mixture (see disclosure, page 3, lines 17-19).

However, Applicants admitted prior art teaches fails to omit the ammonium in the etching step.

Derderian teaches removing a titanium nitride film comprising a 30% hydrogen peroxide solution in water (column 4, lines 40-50). In view of Derderian, it would have been obvious to one of ordinary skill in the art to use only a hydrogen-peroxide and water mixture in Applicant's admitted prior art because under ideal conditions, a bead of etching solution droplet would react completely with film 20 with all available etchant within etching solution droplet and contact angle *theta* would remain substantially orthogonal to the plane of film being etched (column 5, lines 44-47).

7. Pertaining to claims 9, 12, 13 and 16 Applicants admitted prior art discloses a semiconductor process substantially as claimed as discussed above. Applicant's admitted prior art teaches forming cobalt film **110** on the top surface of a silicon substrate **100**, which has a gate electrode **108** and a diffusion layer **102**;

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forming titanium nitride **112** as the cap film on the top surface of cobalt film **110**;
selectively reacting the silicon of silicon substrate **100** and the cobalt film **110**; and
removing titanium nitride film **112** (first portion) which is arranged over underlying
cobalt silicide film using a hydrogen peroxide-water mixture (see disclosure, page 3, lines 17-
19). However, Applicant's admitted prior art fails to disclose a second portion of the titanium
nitride film remaining after the first removal step and removing the second portion. Derderian
teaches a removing a second portion of said titanium nitride film as claimed by Applicant. See
column 3, lines 6-24, where Derderian teaches replenishing the etching solution. In view of
Derderian, it would have been obvious to one of ordinary skill in the art to replenish (please note
that the term "replenished as used by Derderian is the equivalent of "repeat") the etching solution
on Applicants admitted prior art because replenishing the etching solution droplet, while keeping
the droplet of a uniform size, maintains a uniform etching chemistry as the etching solution
droplet would otherwise constantly change in its chemistry as it etches material from the surface
being etched (column 3, lines 7-12).

8. Claims 2, 3, 6, 7, 10, 11, 14 and 15 are rejected under 35 U.S.C. 103(a) as being
unpatentable over Applicant's admitted prior art in view of Derderian et al., U.S. Patent
6,245,191 B1 as applied to claims 1, 4, 5 and 8 above, and further in view of the following
comments.

9. Pertaining to claims 2, 3, 6, 7, 10, 11, 14 and 15, Applicants admitted prior art discloses a
semiconductor process substantially as claimed as discussed above. Given the teaching of the
references, it would have been obvious to determine the optimum thickness, temperature as well
as condition of delivery of the layers involved. See *In re Aller, Lacey and Hall* (10 USPQ 233-

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237) "It is not inventive to discover optimum or workable ranges by routine experimentation.

Note that the specification contains no disclosure of either the critical nature of the claimed ranges or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. *In re Woodruff*, 919 f.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Any differences in the claimed invention and the prior art may be expected to result in some differences in properties. The issue is whether the properties differ to such an extent that the difference is really unexpected. *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986)

Appellants have the burden of explaining the data in any declaration they proffer as evidence of non-obviousness. *Ex parte Ishizaka*, 24 USPQ2d 1621, 1624 (Bd. Pat. App. & Inter. 1992).

An Affidavit or declaration under 37 CFR 1.132 must compare the claimed subject matter with the closest prior art to be effective to rebut a prima facie case of obviousness. *In re Burckel*, 592 F.2d 1175, 201 USPQ 67 (CCPA 1979).

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to W. David Coleman whose telephone number is 703-305-0004.

The examiner can normally be reached on 9:00 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 703-306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7721 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

A handwritten signature in black ink, appearing to read "W. David Coleman", with a stylized flourish at the end.

W. David Coleman
Examiner
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WDC
March 14, 2003